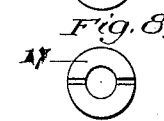
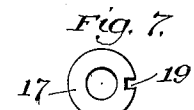
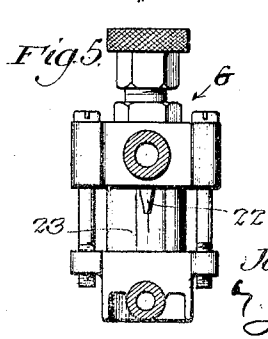
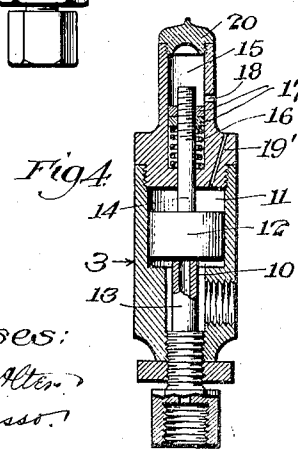
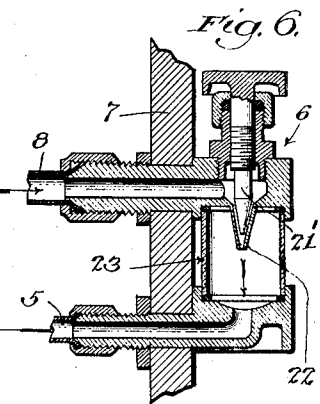
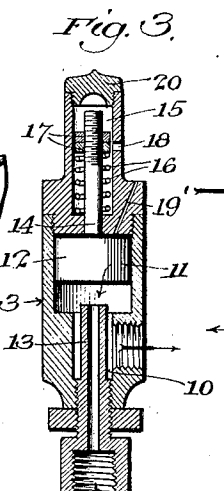
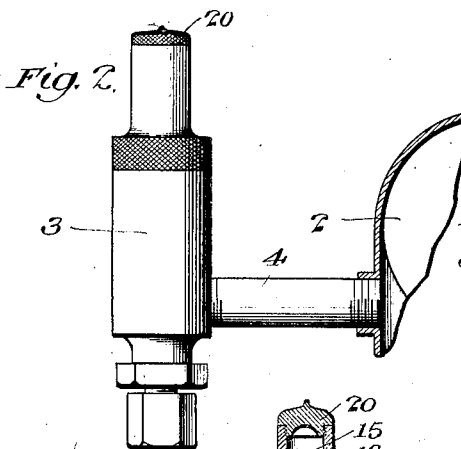
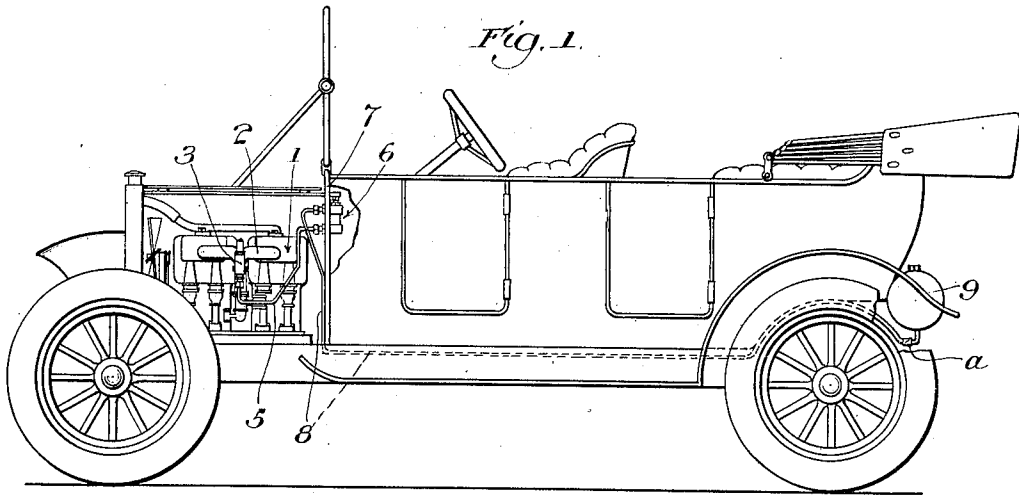


J. R. RICKETTS.  
 WATER FEED SYSTEM FOR INTERNAL COMBUSTION ENGINES.  
 APPLICATION FILED DEC. 1, 1913.

1,119,042.

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# UNITED STATES PATENT OFFICE.

JAMES R. RICKETTS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO  
IRVIN B. HUNSAKER, OF LONG BEACH, CALIFORNIA.

WATER-FEED SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,119,042.

Specification of Letters Patent.

Patented Dec. 1, 1914.

Application filed December 1, 1913. Serial No. 804,012.

To all whom it may concern:

Be it known that I, JAMES R. RICKETTS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Water-Feed System for Internal-Combustion Engines, of which the following is a specification.

This invention relates to a water feed system for internal combustion engines, and the object of the invention is to introduce moisture into the manifold at a point between the carbureter and engine to make a more perfect combustion. The introduction of moisture produces steam, which forms a cushion, stops knocking, and increases power very perceptibly.

Another object is to locate a sight feed indicating means on the dash-board of the vehicle driven by the engine, whereby the rate of feed may be observed at a glance.

Other objects and advantages will be brought out in the following description:

Referring to the drawings: Figure 1 is a side elevation of an automobile with hood removed, and a part of the body broken away to illustrate the invention. Fig. 2 is a rear elevation of the vacuum valve showing part of the manifold in section. Fig. 3 is a vertical sectional view through the vacuum valve. Fig. 4 is a view similar to Fig. 3, showing the vacuum valve closed. Fig. 5 is a rear elevation of the sight feed and manual regulating valve partly in section. Fig. 6 is a vertical sectional view through the sight feed and manual regulating valve. Fig. 7 is a plan view of one of the nuts in the vacuum valve. Fig. 8 is a plan view of a nut.

1 designates the internal combustion engine with inlet manifold 2.

3 is a vacuum valve connected with the manifold 2 by a pipe 4 and by a pipe 5 with a sight feed valve 6, which is located on the dash-board 7 of the automobile. Leading from the sight feed valve 6 is a pipe 8, which extends to a water supply tank 9, which may be located at any convenient point, preferably at the rear of the vehicle, but its level must be below that of the sight feed valve 6, in order to prevent water from entering the vacuum valve by gravity.

The vacuum valve 3 is provided with an annular vacuum chamber 10, the chamber being enlarged at 11 and containing a piston valve 12. In the center of the vacuum cham-

ber 10 is a water tube 13 with its upper end projecting into the enlargement 11 to form a seat for the valve 12. The vacuum chamber 10 communicates directly with the pipe 4, and with the inlet manifold, while the lower end of the water pipe 13 is connected directly with the pipe 5. The piston valve 12 has a stem 14, which projects into a spring chamber 15 formed at the upper end of the vacuum valve, and a compression spring 16 is located within spring chamber 15, and bears upwardly against nuts 17, which are screwed on the stem 14. An air vent 18 is provided which also serves to permit the insertion of an implement to engage a notch 19 formed in the lower nut 17 to hold the same against rotation, while the upper nut is screwed tight, access to the upper nut being obtained by removing the cap 20. A vent 19' is adapted to place the enlarged chamber 11 above the valve 12 in atmospheric communication. Located on the dash-board is a sight feed valve comprising a needle valve 21, which is adapted to control the passage of water through a nozzle 22, which is inclosed by a glass tube 23. The pipe 8 serves to conduct water from the tank 9 to the needle valve 21, but it should be observed that the level of water in pipe 8 will normally stand below the needle valve 21, and will not pass therethrough unless there is suction in the manifold 2 with the valve 21 open. Thus, if the valve 21 should be open, and the engine not running, it is impossible for the water to flow into the manifold. A check valve *a* in the pipe 8 holds the column of water therein while the engine is idle, so that when water is needed in use the column does not have to be reestablished.

In operation, as suction is produced in the manifold, it acts to lower the valve 12 and close it against its seat. As the work of the engine increases and the speed lessens, so that less vacuum is produced, the spring 16 raises the valve 12 an amount corresponding to the decrease in vacuum, thereby placing the interior of the water tube 13 in communication with the vacuum chamber 10, whereupon the vacuum acts upon the tube 13, and back through the pipe 5, and through the needle valve 21, tube 23, and pipe 8, and lifts water from pipe 8 through these connections into the vacuum chamber, and thence into the manifold. This feeding of the water takes place until the vacuum

has increased sufficiently to overcome the spring 16 and close the valve 12, whereupon the action of the suction on the water stops and no more water is fed to the engine.

5 The needle valve 21 is regulated by hand to control the flow of water, and when once set, need not be disturbed, unless it is desired to change the conditions of feed. The automatic control of the feed is performed  
10 entirely by the vacuum valve and this regulates the flow of water. It is not desired to feed the water in when the engine is running idle, or without doing much work, but when  
15 the engine is under heavy duty, and it is desired to increase the power and cushion the action, and it is at such times that the vacuum lowers to a point where it permits the valve 12 to open, and causes the water to be sucked into the manifold.

20 The location of the sight feed on the dash shows at a glance when any water is being sucked into the manifold, and shows approximately the amount. Thus, if but a small amount is being sucked in, the water  
25 drops slowly, whereas, when the suction is less, and the engine is working strongly, the flow of water is so arranged as to become a steady stream, which can be observed. It will be observed that the area of the valve  
30 12 is much greater than the bore of the tube 13, and that the vacuum is evenly distributed and acts directly upon the valve 12, tending to lower it.

What I claim is:

35 1. In a water feed system for internal combustion engines, in combination with the inlet manifold, a water supply tank, a vacuum controlled valve communicating directly with said manifold between the carbureter and cylinder, a pipe for conducting  
40 water from said tank to said vacuum valve, the vacuum in said manifold acting to close said valve, and prevent the flow of water through the pipe to the valve, and means  
45 acting against the valve in opposition to the vacuum to open the valve upon a decrease in the amount of vacuum to permit the lower vacuum to suck water to the valve and into the manifold.

50 2. In a water feed system for internal combustion engines, in combination with the inlet manifold, a water supply tank, a vacuum controlled valve communicating directly with said manifold between the carbureter and cylinder, a pipe for conducting  
55 water from said tank to said vacuum valve, the vacuum in said manifold acting to close said valve, and prevent the flow of water

through the pipe to the valve, and means acting against the valve in opposition to the  
60 vacuum to open the valve upon a decrease in the amount of vacuum to permit the lower vacuum to suck water to the valve and into the manifold, and a manual regulating valve in said pipe.  
65

3. In a water feed system for internal combustion engines, in combination with the inlet manifold, a water supply tank, a vacuum controlled valve communicating with said manifold, a pipe leading from  
70 said vacuum valve to said tank, the vacuum in said manifold acting to normally close said valve, and prevent the flow of water, means acting against the valve to oppose the vacuum and open the valve to permit the  
75 vacuum to suck water into the manifold, and a manual regulating valve in said pipe, said valve being located at a higher elevation than said tank.

4. In a water feed system for internal  
80 combustion engines, in combination with the inlet manifold, a water supply tank, a vacuum controlled valve communicating with said manifold, a pipe leading from said vacuum valve to said tank, the vacuum  
85 in said manifold acting to normally close said valve, and prevent the flow of water, means acting against the valve to oppose the vacuum and open the valve to permit the vacuum to suck water into the manifold, a  
90 manual regulating valve in said pipe, said valve being located at a higher elevation than said tank, and a transparent connection in said pipe at said manual regulating valve.

5. In a water feed system for internal  
95 combustion engines, in combination with the inlet manifold, a vacuum chamber communicating therewith, a water connection communicating with said vacuum chamber, a valve acted upon by the vacuum in said  
100 vacuum chamber to close said water connection and prevent communication of water connection with the vacuum chamber, means opposing said vacuum and tending to open  
105 said valve to give communication of the water connection with the vacuum chamber, means for regulating said opposing pressure, and means for supplying water to said water connection.

In testimony whereof, I have hereunto set  
110 my hand at Los Angeles, California this 25th day of November, 1913.

JAMES R. RICKETTS.

In presence of—  
G. T. HACKLEY,  
LORA M. BOWERS.